



# Avalon Institute of Applied Science Inc.

## Who we are

The Avalon Institute of Applied Science is a private academic institution that specialises in RESEARCH, CONSULTING and TRAINING in Environmental Science, Geological Sciences, Biological Sciences, Biotechnology, Engineering, Automation Systems and Information Technologies for the benefit of the environment, human health and welfare.

The Avalon Institute provides services that may be as simple as a sample core analysis, or a more elaborate data interpretation in our laboratories, or up to complete extensive R&D projects. Although we accept entire research projects, the Avalon Institute can be considered a valuable partner for any ongoing geological, biological, microbiological and environmental research, providing the most competent data analysis and data interpretation.

## Climate Change Issue

The requirement of compliance with the Kyoto Protocol, and increased public awareness have brought many aspects of the complexities of climate change issues into the limelight. The Avalon Institute of Applied Science can be a valuable resource for climate-related topics.

The main strategic goal of our Climate Change projects is to cover the gap in our knowledge on influence of climate change on ecosystems, biodiversity and human settlement under the Global Climate Change (GCC) anticipated in present century.

## Our current projects, interests and capabilities:

### *NATO Workshop and UNESCO/IGCP Research Project*

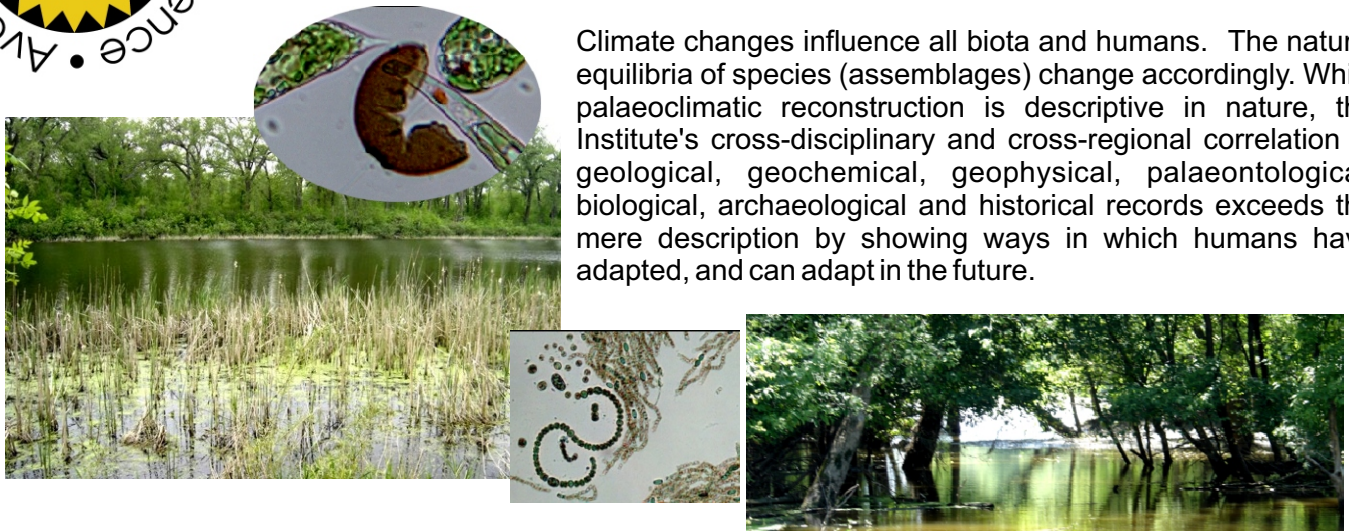
**NATO Advanced Research Workshop (2003) "Climate Change and Coastline Migration"**. The main goal of the project is to discuss the actual status of our knowledge about the influence of the climate change on sea level and coastline migration as factors for human adaptation, and to develop a scientific approach for integrating geological,



prehistoric, historic and instrumental data (for the past century) for prediction of future geocological situation in the areas of a high environmental risk for prevention and mitigation of damages in coastal zones under various sea-level scenarios.

The NATO Workshop eventually resulted in the international **UNESCO-IUGS-IGCP 521 Research Project "Black Sea-Mediterranean Corridor during last 30 ky: Sea level change and human adaptation" (2005-2009)** under the leadership of Prof Yanko-Hombach, president of the Avalon Institute. The "Corridor" is of strategic importance not only for all coastal countries but also for at least 17 other countries sharing a drainage basin that is one-third the size of the European continent. Moreover, the "Corridor" can be used as a model area for other similar environments, e.g., Hudson Bay. The project is focused on evolution of the coastal zone where a rich sedimentary, landform and archaeological archive provides a superb opportunity for studying spatial and temporal interactions between human adaptation and environmental change.

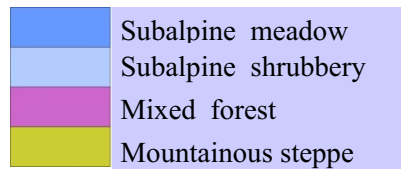
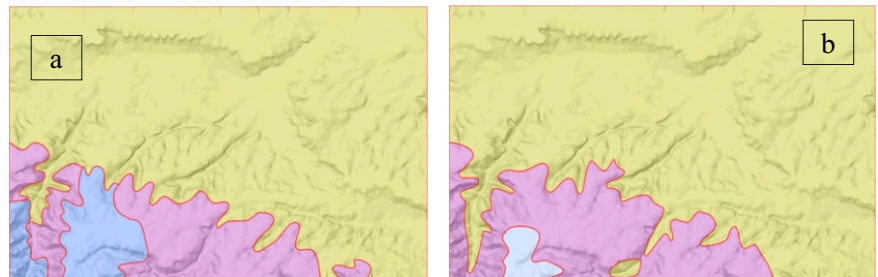
## Adaptation of organisms.



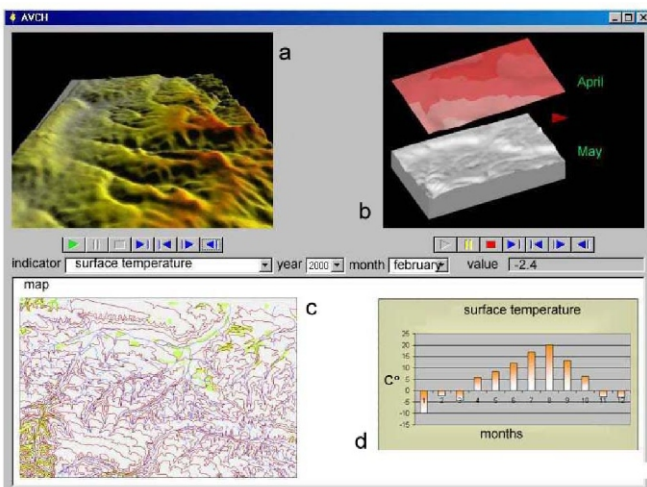
Climate changes influence all biota and humans. The natural equilibria of species (assemblages) change accordingly. While palaeoclimatic reconstruction is descriptive in nature, the Institute's cross-disciplinary and cross-regional correlation of geological, geochemical, geophysical, palaeontological, biological, archaeological and historical records exceeds the mere description by showing ways in which humans have adapted, and can adapt in the future.

## The Advanced Regional High-Resolution Climate Change Model.

Mathematical procedures for high resolution climate modeling are known to involve supercomputers. The Institute's researchers have developed the algorithms to use PC type computers for high resolution climate modeling with a spatial resolution of only 500 m, and a time resolution of 1 day. This unique model is nested in GCM MSU-2 (T42L15),



*Simulated vegetation response to GCC: a – modern climate conditions, b – climate, corresponding to the perpetual negative phase of the North Atlantic Oscillation*



Typical computer output of the climate model

evaluates monthly averaged climatic variables and Climatic Resources and provides their short- and long-term (100 years) projections for the selected region under the GCC. These projections can be used to predict changes in temperature, daily solar radiation, precipitation, wind velocity, humidity, and soil moisture. Projected fields are stored in special GIS database and can be publicised on CD-ROM for further analysis presentation in the form of a slide-show and tables that can be made available on the Internet.